FORM PTO-1390 (REV. 11-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: SENSOR-PCT-1

U.S. APPLICATION NO. (If known, see 37 CFR 1.5): 10/009866

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/GB00/02265	09 June 2000	12 March 1999

TITLE OF INVENTION: OPTO-ELECTRICAL ACTUATION SYSTEM AND METHOD

APPLICANT(S) FOR DO/EO/US: Leggett, Nigel Derek & McInnes, James

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☑ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☑ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☑ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☐ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☑ Amendments to the claims of the International Aplication under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☑ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English lanugage translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☑ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☐ Other items or information:

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
10/009866		

21. ☑ The following fees are submitted:

	CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1000.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$850.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$710.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$690.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 890.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	10 - 20 =		x **$18.00**	$ 0.00	
Independent claims	1 - 3 =		x **$80.00**	$ 0.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ **$270.00**	$ 0.00	
TOTAL OF ABOVE CALCULATIONS			=	$ 890.00	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.			+	$	
SUBTOTAL			=	$ 890.00	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				$	
TOTAL NATIONAL FEE			=	$ 890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property			+	$ 0.00	
TOTAL FEES ENCLOSED			=	$ 890.00	
				Amount to be refunded:	$
				charged:	$

a. ☑ A check in the amount of $ 890.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☑ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 03-3565 . A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Royal W. Craig
Law Offices of Royal W. Craig
210 North Charles Street
Suite 1319
Baltimore, Maryland 21201

SIGNATURE 12/12/01

Royal W Craig
NAME

34.145
REGISTRATION NUMBER

FORM PTO-1390 (REV 11-2000) page 2 of 2

LAW OFFICES OF

ROYAL W. CRAIG

A PROFESSIONAL CORPORATION

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TRANSMITTAL
VIA EXPRESS MAIL No.: EL930234715US

To The Honorable Commissioner
of Patents and Trademarks
Box PCT
Washington, D.C. 20231

LAW
BUSINESS
TECHNOLOGY

Re: International PCT Patent Application PCT/GB00/02265 for "OPTO-ELECTRICAL ACTUATION SYSTEM AND METHOD"; Filed: 9 June 2000; Inventors: Leggett, Nigel Derek & McInnes, James.

Dear Sir:

Enclosed please find the following:

1. Transmittal Letter to The United States Designated /Elected Office (DO/EO/US) concerning a filing under 35 U.S.C.371 *(2 pp) (Form PTO-1390).*
2. Preliminary Amendment.
3. Our check # 2905 in the amount of $890.00 to cover national fee.
4. Our post card. Please date stamp and return.

NOTE: The Declarations/Power of Attorney are not included and will be provided at a later date pursuant to Section 1.495 (c)(2).

FEE REQUIREMENTS FOR CLAIMS AS AMENDED

	Claims remaining after amendment		Highest number previously paid for		Present Extra		Fee
a. Total Effective Claims*	10	minus**	10	=	0	X $ 9.00 =	$ 00.00
b. Independent Claims*	1	minus***	5	=	0	X $39.00 =	$ 00.00
c. Amendment enters multiple dependent claim(s) in application, add $130.00+							
d. Original due date: [x] N/A						TOTAL FEE	$ 00.00

*If the entry in this space is less than entry in the next space, the "Present Extra" result is "0".
**If the "Highest number previously paid for" in this space is less than 20, write "20" in this space.
***If the "Highest number previously paid for" in this space is less than 3, write "3" in this space.

Please charge any unanticipated fees to our Deposit Account No. 03-3565 (a duplicate copy of this charge authorization is attached.)

Date

12/12/01

Respectfully submitted,

Royal W. Craig
Attorney for Applicant
Reg. No. 34,145

I HEREBY CERTIFY that on December 12, 2001, one copy of the above-referenced documents were deposited with the United States Postal Service for delivery by Express Mail to the United States Patent and Trademark Office.

IN THE UNITED STATES RECEIVING OFFICE (RO/US)

In re International Application of

LEGGETT et al.

Publication No. WO 00/77932 (13) A2

Appln. No. PCT/GB00/02265

US Officer: to be assigned

Filed: 09 June 2000

For: OPTO-ELECTRICAL ACTUATION SYSTEM AND METHOD

* * * *

PRELIMINARY AMENDMENT

Honorable Commissioner of Patents
and Trademarks
Box PCT
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please amend the above-identified application as follows:

IN THE CLAIMS:

Please cancel claims 2, 4 and 6.

Please amend claims 1, 7, 8, 9 and 12 as follows, shown here in clean form. A redlined version is being submitted herewith on a separate sheet.

1. An actuation system for a plurality of electrically actuated devices, comprising:

a pulsed light source of variable pulse frequency directed to a plurality of actuation gateways; each gateway being adapted to supply an actuation voltage above a threshold value to an associated device when illuminated by light pulsed at a trigger frequency for that device; each said gateway comprising,

photovoltaic converter means for converting pulsed incident light to a pulsed

electric current of corresponding frequency, and

frequency-sensitive transformer means for transforming the voltage of the pulsed current to a higher voltage above the threshold value for the associated device when the current

frequency is at a trigger frequency.

7. A system according to claim 1 in which the trigger frequency is a band of not more than about 3kHz within the range 10kz-40kHz.

8. A system according to claim 1 in which the trigger frequencies of devices to be operated independently are separated by at least 3kHz.

9. A system according to claim 1 comprising optical pathway means for directing light from the light source to the plurality of actuation gateways.

12. A method of actuating a plurality of electrical devices, comprising providing an actuation system for the said devices according to claim 1, and selectively actuating a device by illuminating the actuation gateways with light pulsed at a frequency that corresponds to the trigger frequency of the selected device.

REMARKS

Consideration and allowance of this application are respectfully requested.

The limitations of claims 2, 4 and 6 have been incorporated into their parent claims

and claims 2, 4 and 6 are canceled to reduce the overall number of claims. In addition, claims 1, 7, 8, 9 and 12 are herein amended to eliminate multiple dependencies.

It is believed that this application is now in condition for allowance, and such a Notice is respectfully requested.

Respectfully submitted,

Royal W. Craig, Reg. No. 34,145
Attorney for Applicant

Date: 12/12/01

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APPENDIX A: REDLINED CLAIMS

Claims 2, 4 and 6 are canceled.

Claims 1, 7, 8, 9 and 12 are amended as follows:

1.(Once amended) An actuation system for a plurality of electrically actuated devices, comprising:

a pulsed light source of variable pulse frequency directed to a plurality of actuation gateways[,]; each gateway being adapted to supply an actuation voltage above a threshold value to an associated device when illuminated by light pulsed at a trigger frequency for that device; each said gateway comprising,

photovoltaic converter means for converting pulsed incident light to a pulsed electric current of corresponding frequency, and

frequency-sensitive transformer means for transforming the voltage of the pulsed current to a higher voltage above the threshold value for the associated device when the current
frequency is at a trigger frequency.

7.(Once amended) A system according to [any one of the preceding claims] claim 1 in which the trigger frequency is a band of not more than about 3kHz within the range 10kz-40kHz.

8.(Once amended) A system according to [any one of the preceding claims] claim 1 in which the trigger frequencies of devices to be operated independently are separated by at least 3kHz.

9.(Once amended) A system according to [any one of the preceding claims] claim 1 comprising optical pathway means for directing light from the light source to the plurality of actuation gateways.

12.(Once amended) A method of actuating a plurality of electrical devices, comprising providing an actuation system for the said devices according to [any one of the preceding claims] claim 1, and selectively actuating a device by illuminating the actuation gateways with light pulsed at a frequency that corresponds to the trigger frequency of the selected device.

OPTO-ELECTRICAL ACTUATION SYSTEM AND METHOD

This invention relates to an opto-electrical actuation system and method. Specifically, it relates to a system and method in which light is used to selectively actuate and control a plurality of electrical devices. References to actuation herein are intended to include controlling and/or supplying operating power to the devices.

The system and method in accordance with the invention are intended to supply electrical power at an effective actuating voltage selectively to one or more of a plurality of devices. The power may be used to switch the devices, or to supply running power to them, according to the demands of the devices and the availability of other electrical power sources.

The invention is particularly suitable for downhole use at oil and gas exploration and production sites, in environments where temperatures can reach up to 300°C.

In accordance with one aspect of the invention, there is provided an actuation system for a plurality of electrically actuated devices, comprising a pulsed light source of variable pulse frequency directed to a plurality of actuation gateways each adapted to supply an electrical actuation voltage above a threshold value to an associated device when illuminated by light pulsed at a trigger frequency for that device.

Each said gateway is suitably provided with an optical sensor such as photovoltaic converter means for converting pulsed incident light to a low voltage pulsed electrical current in the order of 3 to 5 volts, of corresponding

frequency. Frequency sensitive ferroelectric DC-DC converter means may be provided for transforming the low voltage of the pulsed current to a higher voltage above the threshold value, typically 600-800 volts, for the associated device when the current frequency is at the trigger frequency. The DC-DC converter means may be a ferroelectric transformer and the trigger frequency is then suitably a resonant frequency of the transformer selectably adjusted by variation in the component geometry. In some embodiments of the invention output voltages for the converter as low as 100 volts may be adequate to activate the associated device.

The trigger frequency may be in a band of not more than about 3kHz within the range 10kHz to 40kHz. The trigger frequencies of ferroelectric transformers to be operated independently are suitably separated to compensate for environmental effects, such as pressure and temperature, by a frequency difference of about 3kHz or more.

The system desirably includes optical pathway means for directing light from the light source to the plurality of actuation gateways. The optical pathway means may comprise a branched network of optical fibres connected by optical couplers. The coupler splitting ratios may be selected to provide optimum power to the devices to be actuated. Such ratios will depend upon the number of devices on the network and the available light source power. Typical optical coupling splitting ratios are in the order of 5:1 and are so selected as to provide optical power in the order of 40 to 50mW to the photovoltaic converter. The optical couplers should also be selected from materials suitable for the elevated thermal conditions of the surrounding environment. A sufficient optical power budget should be provided to accommodate changes in splitting ratio and photovoltaic conversion efficiency under the changing environmental conditions.

The invention further provides a method of actuating a plurality of electrical devices which comprises providing an actuating system for the said devices as

set out above, and selectively actuating a device by illuminating the actuation gateways with light pulsed at a frequency that corresponds to the trigger frequency of the selected device.

One embodiment of the invention is illustrated by way of example in the accompanying drawing, which illustrates diagrammatically an actuation and control system in accordance with the invention.

As shown in the drawing, a single light source 10 is connected to an optical fibre backbone 12, along which a series of optical couplers 13 make optical connection between the backbone fibre and branch fibres 14. Light pulsed from the light source is conducted by the optical network (12, 13, 14) throughout the system.

Branch fibres 14 deliver light to actuation gateways each associated with an electrical device 20. Each gateway comprises a photovoltaic converter 16 and a ferroelectric transformer 18. The devices 20 could be, for example, pilot valves, solenoid valves, motors and electrically powered instrumentation.

Each photovoltaic transformer 18 has a natural resonant frequency range of, typically, 3kHz or less. When provided with pulsed electrical current at a resonant frequency, the transformer increases the voltage to a value that is above a threshold value required to actuate the electrical device 20. If pulsed current is supplied to the transformer 18 at a frequency outside its resonant trigger frequency range, the voltage increase is low, and does not reach the threshold value.

The photovoltaic converter 16 at each gateway responds to incident light transmitted over the optical network from light source10 and converts it into electrical current of a corresponding pulse frequency. Accordingly, the pulse frequency of the light emitted by the light source determines the frequency of

the electrical current applied to all the transformers 18 in the system at the same time.

In accordance with the invention, electrical devices 20 that are intended to operate simultaneously are associated with actuation gateways in which the transformers 18 have similar resonant trigger frequencies, and electrical devices that are intended to operate independently are provided with actuation gateways in which the transformers have distinctly different resonant frequencies. In this way, the devices to be actuated can be selected by appropriate selection of the pulse frequency at the light source.

Typical operating frequencies of a series of devices in accordance with the invention are 13-16kHz for the first device, 19-22kHz for the second device, and so on, with each device having a 3kHz trigger frequency band with a 3kHz separation between bands.

As an example, the output voltage of the photovoltaic converters 16 may be from 3 to 5 volts. If, and only if, the light pulse frequency is such as to produce an electrical frequency in the resonant trigger band of the transformer 18, the transformer output may be 600-800V, sufficient to actuate the associated electrical device.

CLAIMS

1 An actuation system for a plurality of electrically actuated devices, comprising a pulsed light-source of variable pulse frequency directed to a plurality of actuation gateways; each gateway being adapted to supply an actuation voltage above a threshold value to an associated device when illuminated by light pulsed at a trigger frequency for that device; each said gateway comprising photovoltaic converter means for converting pulsed incident light to a pulsed electric current of corresponding frequency; and each said gateway comprising frequency-sensitive transformer means for transforming the voltage of the pulsed current to a higher voltage above the threshold value for the associated device when the current frequency is at a trigger frequency.

2. A system according to claim 1 wherein the transformer means comprises a ferroelectric transformer and the trigger frequency is a resonant frequency of that transformer.

3. A system according to claim 1 or claim 2 wherein the output voltage of the photovoltaic converter means is 3 to 5 volts.

4. A system according to claim 1, claim 2 or claim 3 wherein the higher voltage is 600 to 800 volts.

5. A system according to any one of the preceding claims in which the trigger frequency is a band of not more than about 3kHz within the range 10kHz-40kHz.

6 A system according to any one of the preceding claims in which the trigger frequencies of devices to be operated independently are separated by at least 3kHz.

AMENDED SHEET

7. A system according to any one of the preceding claims comprising optical pathway means for directing light from the light source to the plurality of actuation gateways.

8. A system according to claim 7 wherein the optical pathway means comprises a branched network of optical fibres connected by optical couplers.

9. A system according to claim 8 wherein the optical couplers provide optical power of 40 to 50mW to each actuation gateway.

10. A method of actuating a plurality of electrical devices, comprising providing an actuation system for the said devices according to any one of the preceding claims, and selectively actuating a device by illuminating the actuation gateways with light pulsed at a frequency that corresponds to the trigger frequency of the selected device.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

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21 December 2000 (21.12.2000)

PCT

(10) International Publication Number
WO 00/77932 A2

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(22) International Filing Date: 9 June 2000 (09.06.2000)

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9913600.4 12 June 1999 (12.06.1999) GB

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(72) Inventors; and
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(81) Designated States *(national)*: AU, BR, CA, GB, NO, RU, US.

(84) Designated States *(regional)*: Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

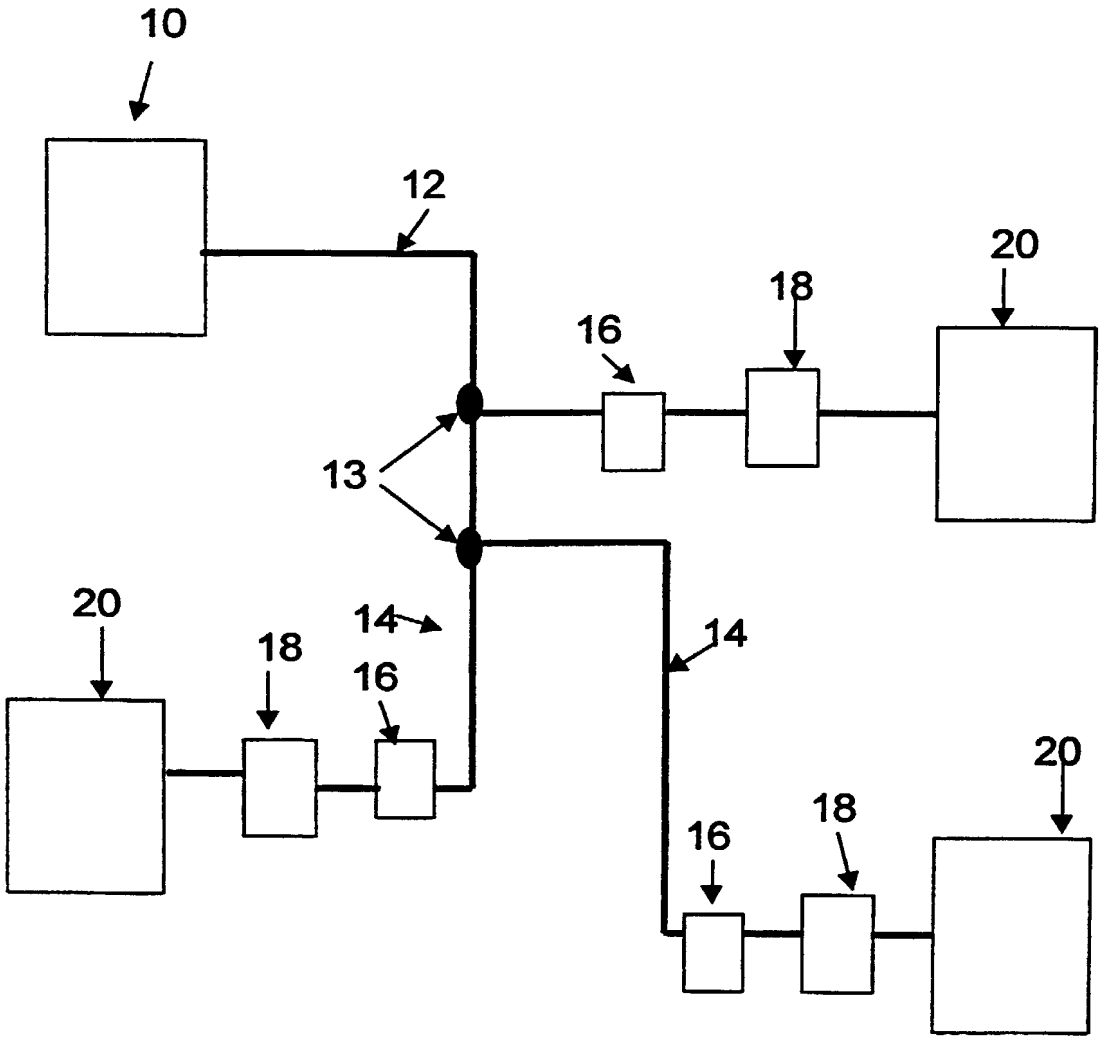
Published:
— *Without international search report and to be republished upon receipt of that report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 00/77932 A2

(54) Title: OPTO-ELECTRICAL ACTUATION SYSTEM AND METHOD

(57) Abstract: A selective optical actuation system for a plurality of electrical devices (20) comprises a variable pulse frequency pulsed light source (10) and an optical fibre network (12, 13, 14) distributing the light pulses to an actuation gateway for each device, comprising a photovoltaic converter (16) whose correspondingly pulsed electrical output is applied to a ferroelectric transformer (18). Only if the pulse frequency is within the resonant band for a given transformer will the voltage be raised above a threshold value rquired to actuate that device. Choice of light pulse frequency thereby determines the device(s) to be actuated.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PTO/SB/01 (10-00)
Approved for use through 10/31/2002. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☐ Declaration Submitted with Initial Filing OR ☑ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	SENSOR-PCT-1
First Named Inventor	LEGGETT, Nigel Derek
COMPLETE IF KNOWN	
Application Number	10 / 009,866
Filing Date	12/12/ 2001
Group Art Unit	To be assigned
Examiner Name	To be assigned

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

OPTO-ELECTRICAL ACTUATION SYSTEM AND METHOD

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☑ was filed on (MM/DD/YYYY) 12/12/ 2001 as United States Application Number or PCT International Application Number PCT/GB00/02265 and was amended on (MM/DD/YYYY) 12/12/2001 (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	Certified Copy Attached? NO
9913600.4	UNITED KINGDOM	06/12/1999	☐ ☒ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

Burden Hour Statement: This form is estimated to take 21 minutes to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Please type a plus sign (+) inside this box → [+]

PTO/SB/01 (10-00)
Approved for use through 10/31/2002. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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DECLARATION — Utility or Design Patent Application

Direct all correspondence to: ☐ Customer Number or Bar Code Label [ ] OR ☑ Correspondence address below

Name: Royal W. Craig

Address: Law Offices of Royal Craig

Address: 10 North Calvert Street, Suite 153

City: Baltimore | State: MD | ZIP: 21202

Country: USA | Telephone: (410) 385-2383 | Fax: (410) 385-2385

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-00

NAME OF SOLE OR FIRST INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]): Derek. Nigel | Family Name or Surname: LEGGETT

Inventor's Signature: Nigel Leggett GBX | Date: 1st July 02

Residence: City: Winchester | State: | Country: GB | Citizenship: GB

Mailing Address: Field Cottage, Wonston, Winchester, Hampshire, S021 3LS

Mailing Address:

City: WInchester | State: Hampshire | ZIP: | Country: United Kingdom

2-00

NAME OF SECOND INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]): James | Family Name or Surname: McINNES

Inventor's Signature: James McInnes GBX | Date: 1st July '02

Residence: City: Winchester | State: | Country: GB | Citizenship: GB

Mailing Address: 11 Priors Dean Road, Harestock, Winchester, Hampshire S022 6JT

Mailing Address:

City: Winchester | State: Hampshire | ZIP: | Country: United Kingdom

☐ Additional Inventors are being named on the ___supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.

[Page 2 of 2]